CLAIMS

What is claimed:

1. A method of effecting a change in a surgical procedure comprising the steps of:

contacting tissue of a patient with a pH electrode;

measuring the pH of the tissue with the pH electrode to monitor the pH of the tissue during the surgical procedure;

determining if the tissue pH falls below a threshold level indicative of acidosis; and

determining the need for revascularization of the tissue if the tissue pH measurement falls below the threshold level indicative of acidosis.

2. The method of effecting a change in the surgical procedure of Claim 1 wherein the step of contacting tissue further comprises inserting the pH electrode into the tissue.

3. The method of effecting a change in the surgical procedure of Claim 1 wherein the step of determining the need for revascularization further comprises identifying specific segments of the tissue requiring revascularization by at least one of examining the onset of acidosis during the procedure and the response of the tissue pH to atrial pacing.

4. The method of effecting a change in the surgical procedure of Claim 3 wherein the response to atrial pacing can be used during at least one of an intra-operative duration and post-operative duration.

5. The method of effecting a change in the surgical procedure of Claim 1 wherein the step of contacting the pH electrode to the tissue of a patient is performed manually.

6. The method of effecting a change in the surgical procedure of Claim 1 wherein the step of contacting the pH electrode to the tissue of a patient is performed by a percutaneous catheter.

7. The method of effecting a change in the surgical procedure of Claim 1 wherein the step of contacting the pH electrode to the tissue of a patient is performed using one of a laparoscope, an endoscope and a colonscope.

8. The method of effecting a change in the surgical procedure of Claim 1 wherein the tissue is myocardial tissue.

9. A method of effecting a change in a surgical procedure comprising the steps of:

contacting tissue of a patient with a pH electrode;

measuring the pH of the tissue with the pH electrode to monitor the pH of the tissue during the surgical procedure;

determining if the tissue pH falls below a threshold level indicative of acidosis; and

changing the order of revascularization of the tissue if the tissue pH measurement falls below the threshold level indicative of acidosis.

10. The method of effecting a change in the surgical procedure of Claim 9 wherein the step of contacting tissue further comprises inserting the pH electrode into the tissue.

11. The method of effecting a change in the surgical procedure of Claim 9 wherein the step of changing the order of revascularization further comprises first revascularizing most ischemic segments of the tissue.

12. The method of effecting a change in the surgical procedure of Claim 9 wherein the step of changing the order of revascularization further comprises

revascularizing most ischemic segments of myocardium tissue to minimize the degree of acidosis during aortic clamping.

13. The method of effecting a change in the surgical procedure of Claim 9 wherein the step of contacting the pH electrode to the tissue of a patient is performed manually.

14. The method of effecting a change in the surgical procedure of Claim 9 wherein the step of contacting the pH electrode to the tissue of a patient is performed by a percutaneous catheter.

15. The method of effecting a change in the surgical procedure of Claim 9 wherein the step of contacting the pH electrode to the tissue of a patient is performed using one of a laparoscope, an endoscope and a colonscope.

16. The method of effecting a change in the surgical procedure of Claim 9 wherein the tissue is myocardial tissue.

17. A method of determining a change in a surgical procedure comprising the steps of:

contacting tissue of a patient with a pH electrode;

measuring the pH of the tissue with the pH electrode to monitor the pH of the tissue during the surgical procedure;

determining if the tissue pH falls below a threshold level indicative of acidosis; and

reducing a duration of ischemic time of the tissue if the tissue pH measurement falls below the threshold level indicative of acidosis.

18. The method of effecting a change in the surgical procedure of Claim 17 wherein the step of contacting tissue further comprises inserting the pH electrode into the tissue.

19. The method of effecting a change in the surgical procedure of Claim 17 wherein the step of reducing the duration of ischemic time further comprises altering the procedure such as by one of shortening the procedure, changing the surgeon, and canceling the procedure.

20. The method of effecting a change in the surgical procedure of Claim 17 wherein the step of contacting the pH electrode to the tissue of a patient is performed manually.

21. The method of effecting a change in the surgical procedure of Claim 17 wherein the step of contacting the pH electrode to the tissue of a patient is performed by a percutaneous catheter.

22. The method of effecting a change in the surgical procedure of Claim 17 wherein the step of contacting the pH electrode to the tissue of a patient is performed using one of a laparoscope, an endoscope and a colonscope.

23. The method of effecting a change in the surgical procedure of Claim 17 wherein the tissue is myocardial tissue.

24. A method of determining a change in a surgical procedure comprising the steps of:

contacting tissue of a patient with a pH electrode;

measuring the pH of the tissue with the pH electrode to monitor the pH of the tissue during the surgical procedure;

determining if the tissue pH falls below a threshold level indicative of acidosis; and

delaying weaning from cardiopulmonary bypass if the tissue pH measurement falls below the threshold level indicative of acidosis.

25. The method of effecting a change in the surgical procedure of Claim 24 wherein the step of contacting tissue further comprises inserting the pH electrode into the tissue.

26. The method of effecting a change in the surgical procedure of Claim 24 wherein the step of contacting the pH electrode to the tissue of a patient is performed manually.

27. The method of effecting a change in the surgical procedure of Claim 24 wherein the step of contacting the pH electrode to the tissue of a patient is performed by a percutaneous catheter.

28. The method of effecting a change in the surgical procedure of Claim 24 wherein the step of contacting the pH electrode to the tissue of a patient is performed using one of a laparoscope, an endoscope and a colonscope.

29. The method of effecting a change in the surgical procedure of Claim 24 wherein the tissue is myocardial tissue.

30. A method of controlling a fluid delivery system based on pH data comprising the steps of:

providing tissue pH data;

determining if selected tissue pH data falls below a threshold level indicative of a tissue condition; and

controlling fluid flow in response to the determination.

31. The method of Claim 30 further comprising the step of providing a controller connected to the delivery system.

32. The method of Claim 30 wherein the step of controlling delivery of preservation fluid to a site further comprises the step of altering the flow rate of the fluid.

33. The method of Claim 30 wherein the step of controlling flow further comprises the step of altering a temperature of a preservation fluid.

34. The method of Claim 30 wherein the step of controlling flow further comprises the step of altering the site of delivery of the fluid.

35. The method of Claim 30 wherein the step of controlling flow further comprises the step of directing the solution through a valve.

36. The method of Claim 30 wherein the method further comprises the step of displaying changes in a procedure.

37. The method of Claim 30 further comprising providing temperature and fluid pressure data.

38. The method for dispersing cardioplegia within a specific myocardial segment comprising:

applying occlusive pressure to a coronary artery proximal to the sight of insertion of a new vein graft; and

perfusing a cardioplegic solution through a proximal end of the graft.

39. A method for preventing cell apoptosis comprising:

providing a pH electrode and monitor;

inserting the pH electrode into a tissue site;

measuring tissue pH; and

reversing tissue ischemia to prevent cell apoptosis.